

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/021,072
Applicant : Masutsugu Tasaki
Filed : Dec. 19, 2001
TC/A.U. : 2871
Examiner : G. Y. Wang

Confirmation No.: 6223

Docket No. : TASA3001/JDB
Customer No. : 23364

I HEREBY CERTIFY THAT THIS PAPER IS
BEING FACSIMILE TRANSMITTED TO THE
U.S. P.T.O. ON THE DATE SHOWN BELOW:

Date: October 8, 2003
By: Joseph DeBenedictis
Joseph DeBenedictis

RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22202-3514

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Sir:

This is in response to the Office Action dated July 8, 2003, the period for response to which is set to expire on October 8, 2003.

In response to the examiner's comments in item 4 on page 3 of the office action, applicant wishes to confirm that the subject matter of all the claims was commonly owned at the time the invention was made.

The examiner has rejected claims 1-8, 10 and 16-17 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of Barish and Nagy et al. In addition the examiner has rejected claims 9 and 11-15 under 35 U.S.C. § 103(a) as being unpatentable over these same cited references and further in view of Shigemura. Applicant has carefully considered both of these rejections but they are most respectfully traversed for the reasons discussed below.

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Before discussing the rejection, applicant first wishes to emphasize that the present invention relates to improvements in a liquid crystal display (LCD) device. In particular, the improvement relates to dealing with problems associated with the clearance defined between the liquid crystal display panel and the transparent protection plate. As noted in the specification, the aforementioned clearance is utilized in LCD devices to prevent a reduction in display quality caused by local exertion of a pressure on the liquid crystal display panel from a pen at the time of hand-writing input (see the paragraph bridging pages 1-2 of the specification).

It is also noted in the specification that such a clearance is associated with an air layer between the liquid crystal display panel and the transparent protection plate and this air layer leads to undesirable problems (see the first paragraph on page 2 of the specification).

The specification describes various prior art methods for dealing with problems associated with this air layer. It is mentioned in the second paragraph on page 2 of the specification that one prior art method for dealing with the problems associated with the air layer is to inject a curable polymeric material between the display panel and the transparent protection plate and cure this material in place to form a shock-absorbing layer. The specification notes that this approach to solving the problems associated with the air layer is undesirable because of poor productivity (see the third paragraph on page 2 of the specification).

The specification goes on to describe other techniques which employ an already-cured plate-shaped sheet between the liquid crystal display panel and the transparent protection plate instead of the aforementioned injection of a curable polymeric material (see the fifth line from the bottom of page 2 to page 5, line 15). However, it is noted in the specification that the use of an already-cured or finished sheet used in the prior art must be tacky and that the tacky surfaces of the finished sheets are likely to be stained during the assembly process and such staining of the tacky surface reduces the

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tackiness (see the last paragraph on page 5 of the specification). It is mentioned on page 14, lines 11-12 that once the tacky sheets are stained with, for example dust, it is difficult to remove the dust due to the chemical affinity between the dust and the tacky surface of the sheet. Furthermore it is noted in the last paragraph on page 5 of the specification that air enters the space due to dust or the like which is adhered to the tacky surface and this results in loss of reflection which reduces visibility.

The present invention overcomes the aforementioned problems associated with tacky sheets by the discovery and use of nontacky sheets which have certain characteristics which permit the sheet, when introduced into the clearance defined between the liquid crystal display panel and the transparent protection plate, to become adhered to the liquid crystal display panel and the transparent protection plate (see the three paragraphs under the heading "Summary of the Invention" on page 6 of the specification). Furthermore, it is to be noted from the summary of the invention that the sheet which is adhered to the crystal display panel and the transparent protection plate eliminate the trapping of air within the clearance by a simple operation (i.e., by simply placing the silicone sheet in this clearance space and, in this regard, it is to be noted that the nontacky sheet is adhered to the liquid crystal display panel and the transparent protection plate and thus has a thickness which is equal to the spacing or clearance between the liquid crystal display panel and the transparent protection plate (see the last two lines on page 14 and figure 1).

It is thus self-evident that placing the nontacky sheet in the clearance as described above eliminates trapping of an air layer or air by a simple operation (see the first paragraph under the heading "Summary of the Invention". Furthermore, staining with dust or the like is easily eliminated by a cleaning procedure which simply involves contacting the dust stained sheet with an adhesive tape to easily clean and remove the dust or stain (see page 14, lines 7-10). This is not possible with a tacky sheet since once stain or dust is attached to a tacky sheet, it is adhered to the tacky surface by chemical affinity (see page 14, lines 11-12).

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Turning now to the rejections, the examiner urges that it would be obvious to arrive at the claimed invention by placing the nontacky silicone sheet disclosed by Barrish between the LCD panel and the transparent protective plate since one would be motivated by ease of replacement.

Barrish relates the LCD panel itself used as a stylus actuated electrical switching device (see column 1, lines 6-11) whereas the present invention relates the air layer formed between the LCD panel and the transparent protection plate (see description of the related art and summary of the invention). According to Barrish, the stylus actuated electrical switching device comprises at least a conductive layer 18 and a conductive element 10 to produce "write" (see column 2, lines 28 to 43 and figure 1). The panel is actuated when the stylus 6 is pressed against the plastic layer 16 face of flexible sheet 4, the conductive layer 18 formed on the other face of the sheet 4 contacts with conductive element 10 formed on supporting member to thereby produce a "write" (see column 2, lines 51 to 65). The nontacky silicone sheet 14 of figure 2 as the examiner mentions is formed between the conductive layer 18 and the conductive element 10. Barrish mentions that the nontacky silicone sheet functions to adjust the holding time of conductive layer 18 in contact with conductive element 10. It is clear from the above that the nontacky silicone sheet is therefore part of the LCD panel and thus the disclosure of Barrish is concerned about the LCD panel itself.

The inventors of the claimed invention point out in the description of the related art that the LCD panel of figures 1 and 2 as disclosed in Barrish is associated with the problem of display quality reduction caused by local exertion of pressure on the LCD panel from the stylus.

Even though figure 3 of Barrish discloses a protective plastic sheet 20 which is applied over the flexible sheet 14, no sheet is inserted between sheets 20 and 14. Barrish is silent about inserting the sheet between sheet 20 and 14. Therefore, Barrish provides absolutely no solution for addressing the problem to which applicant's

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invention pertains. In other words Barrish provides no solution for avoiding the reduction in visibility of the LCD when applying the protective sheet such as sheet 20 over the LCD panel. Applicant's invention provides a solution to this problem.

In view of the above, it is clear that the disclosure of Barrish cannot provide the motivation for one skilled in the art to insert the sheet used in applicant's invention between the protective layer and the LCD panel.

The examiner mentions that Nagy discloses nontacky substances which are easy to apply and are nonbubble forming and do not cause optical or cosmetic blemishes. In this regard the examiner directs applicant's attention to column 3, lines 38 to column 4, line 8. Applicant disagrees with the examiner's comments.

According to Nagy, the nontacky substance as the examiner points out is "water remoistenable adhesive" which is the adhesive used to bond the reflective light polarizing structure to the liquid crystal cell 17 (see column 3, lines 10 to 20 and line 38).

Nagy mentions that the water remoistenable adhesive is "not tacky as applied" (see column 3, line 41), which means that the water remoistenable adhesive is the adhesive applied onto the tie coat 16 (see column 3, lines 18 to 37).

As to the ease of removing the water remoistenable adhesive as pointed out by the examiner, Nagy mentions that water remoistenable adhesive is easy to remove with water (see column 4, line 6). Clearly this indicates that the water remoistenable adhesive is not easy to remove without water. Furthermore, the water remoistenable adhesive is formed as the outermost layer and the water remoistenable adhesive needs to adhere to the tie coat 16 once applied thereto. Therefore, the water remoistenable adhesive has tackiness to tie coat 16.

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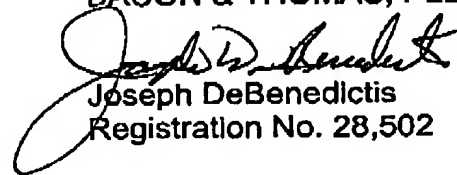
As mentioned above, the water remoistenable adhesive has adhesive characteristics at the time of application and this characteristic allows the adhesive to adhere to tie coat 16 once it has been applied thereto and thus particles may stick to the surface of tie coat 16 when the particles are already present thereon.

Nagy mentions that water remoistenable adhesive is in liquid state when it is applied to the lamination (see column 3, lines 20 to 37). Therefore, if the water remoistenable adhesive is formed on the LCD panel, water which is used to remove the adhesive may disable the LCD panel. In addition, since the water remoistenable adhesive is applied in a liquid state, this liquid state adhesive may also disable the LCD panel. Furthermore, clarity of the LCD panel may be lowered due to high temperatures since the temperature of the water remoistenable adhesive is about 50 to 60°C when applied (see column 3, lines 36 to 37).

In view of the above, it is clear that the disclosure of Nagy would not motivate one skilled in the art to use a water remoistenable adhesive as the sheet which is inserted between the protective layer and the LCD panel as in applicant's claimed invention.

In view of the above arguments, applicant submits that the rejections are untenable and must be withdrawn.

Respectfully submitted,
BACON & THOMAS, PLLC



Joseph DeBenedictis
Registration No. 28,502

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BACON & THOMAS
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314
Phone: (703) 683-0500
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